BOBOVNIKOV, B.M.; TSIRLIN, Yu.A.; CHEPIGO, S.V.; SHPUNTOVA, M.Ye.

Obtaining furfurole and ethyl alcohol by complex processing of cottonseed hulls. Gidroliz. i lesokhim. prom. 10 no.2:14-17 '57. (MLRA 10:5)

1. Andizhanskiy gidroliznyy zavod (for Bobovnikov). 2. Vsesoyuznyy nauchno-issledovatel'skiy institut gidroliznoy i sul'fitno-spirtovoy promyshlennosti. (for TSirlin, Chepigo, and Shpuntova).
(Furaldehyde) (Ethyl alcohol) (Cottonseed)

51-4-3-24/30

AUTHORS: Kounik, S. N., Startsev, V. I. and Tsirlin, Yu. A.

TITLE: The Temperature Dependence of γ-Scintillations in Caesium Iodide Crystals Activated by Thallium (Temperaturnaya zavisimost' γ-stsintillyatsiy v kristallakh iodistogotseziya, aktivirovannogo talliyem.)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol.IV, Nr.3, pp.411-412 (USSR)

ABSTRACT: The authors studied the temperature dependence (in the 30-150°C region) of luminescence of CsI(Tl) when excited with γ-rays. A photomultiplier of the FEU-S type was used. A cylindrical crystal of CsI with 0.041% of Tl. of 10 mm diameter and 6 mm height was placed in a cylindrical recess in a solid block of copper. This block was heated indirectly and crystal temperature was measured by means of a copper-constantan thermocouple with an accuracy of ± 3%. Co^{60} was used as the source of γ-rays. The intensity of scintillations was found by measurement of the anode current of the photomultiplier. The experiments were made on four samples cut from different monocrystals. The results are shown in

Card 1/2

The Temperature Dependence of γ-Scintillations in Caesium Iodide Crystals Activated by Thallium. 51-4-3-24/30

the figure on p.412, where the scintillation yield (I) is plotted against temperature. Curve 1 (continuous) gives the experimental values, and curve 2 (dashed) gives theoretical values calculated from the equation $I = A/\left[1+b \exp(-\varepsilon/kT)\right]$ with $b = 3.15 \times 10^{4}$ and $\varepsilon = 4.9 \times 10^{-13}$ ergs. Near room temperature the decrease of scintillation intensity is about 0.7 % per degree. There is 1 figure and 2 Soviet references.

SUBMITTED: July 1, 1957.

1. Caesium iodide crystals--Luminescence 2. Thallium (activated)--Applications 3. Luminescence--Temperature effects 4. Photomultipliers--Applications

Card 2/2

AUTHOR: Tsirlin, Yu. A. SOV/120-58-5-3/32

TITLE: On the Effect of the Channel Width of a Pulse Height Analyzer on the Resolving Power of a Scintillation Spectrograph (O vliyanii shiriny kanala analizatora impul'sov na razreshayushchuyu sposobnost' stsintillyatsionnogo spektrografa)

PERIODICAL: Pribory i tekhnika eksperimenta, 1958, Nr 5, p 34 (USSR)

ABSTRACT: A scintillation counter introduces a spread into the pulse spectrum of mono-energetic particles. For a single crystal spectrometer the distribution of pulses is close to the Gaussian error curve and may be characterised by a standard deviation σ or the resolving power:

$$R = \Delta V/\overline{V} = 2.36\ \sigma/\overline{V} \quad , \qquad (1)$$

where ΔV is the width at half-height and $\overline{V}$ is the average pulse height. A pulse height analyzer introduces an additional spread depending on the channel width A. However, the distribution of pulses remains close to a Gaussian distribution with a mean at $\overline{V} - A/2$. The total

Card 1/2

On the Effect of the Channel Width of a Pulse Height Analyzer on the Resolving Power of a Scintillation Spectrograph

resolving power of the instrument, R_1 , is given by :

$$R_1 = R\left[1 + 0.28(A/\Delta V)^2\right] \quad . \qquad (2)$$

Eq.(2) was obtained by integrating the Gaussian curve between V and V + A and subsequent approximation of the expression obtained by a Gaussian function. There are no figures or references.

ASSOCIATION: Khar'kovskiy filial VNII khimicheskikh reaktivov (Khar'kov Branch of the All-Union Scientific Research Institute for Chemical Reagents)

SUBMITTED: November 16, 1956.

SOV/51-6-3-25/28

AUTHORS: Tsirlin, Yu.A., Komnik, S.N. and Soyfer, L.M.

TITLE: Dependence of the Luminescence Yield of α- and γ-Excited CsI(Tl) Crystals on the Concentration of Tl (Zavisimost' vykhoda lyuminestsentsii pri α- i γ-vozbuzhdenii kristallov CsJ(Tl) ot kontsentratsii Tl)

PERIODICAL: Optika i Spektroskopiya, 1959, Vol 6, Nr 3, pp 422-424, (USSR)

ABSTRACT: CsI(Tl) crystals have many advantages when used in scintillation counters. The present paper reports the dependence of the luminescence quantum yield of CsI(Tl) excited with either α-particles from Po^{210} or γ-rays from Cs^{137} on the amount of Tl; the latter was varied from 0.005 to 0.5 wt. %. The α-yield (Fig.2) reaches saturation at about 0.1% Tl. The γ-yield (Fig.3) has a maximum at 0.01 - 0.03% Tl and falls slowly with further increase of the Tl concentration. The ratio of the α-particle and γ-ray yields (α/γ) is shown in Fig.4 as a function of the amount of Tl in CsI(Tl); this ratio reaches saturation ($\alpha/\gamma = 0.55$) at about 0.1% Tl.

Card 1/2

The curves of Figs.2 and 3 were obtained by irradiation of 2 mm thick disks cut from monocrystals grown by the Stockbarger method. A typical distribution of Tl along a monocrystal is shown in Fig.1. The quantum yields were found using a FEU-29 photomultiplier and either (a) measuring the anode current of the photomultiplier (the results are denoted by circles in Figs.2 and 3), or (b) counting the pulses and measuring their peaks (crosses in Figs.2 and 3). Both methods gave identical results which show that the scintillation decay time is independent of the amount of Tl. Acknowledgment is made to a group of workers led by A.M. Bulgakova who analysed the crystals for thallium. There are 4 figures and 10 references, of which 4 are Soviet, 4 English, 1 Swiss and 1 Italian.

SUBMITTED: July 14, 1958

24(4), 24(2)

AUTHORS: Breydo, I.Ya., Tsirlin, Yu.A. and Shishova, L.N. SOV/56-7-1-13/27

TITLE: Determination of the Luminescence Energy Yield of Plastic Scintillators Subjected to γ-Rays (Opredeleniye energeticheskogo vykhoda lyuminestsentsii plastmassovykh stsintillyatorov pod deystviyem γ-luchey)

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 1, pp 60-62 (USSR)

ABSTRACT: The luminescence energy yield, defined as the efficiency of transformation of the energy of recorded radiation into light energy, is perhaps the most important property of a scintillator. In practice the "technical" energy yield is measured; this is smaller than the true ("physical") energy yield due to absorption of scintillation light in the scintillator itself and in reflectors which are used to improve the light-collecting ability of the phosphor. The present paper described a determination of the energy yield of γ-luminescence of a plastic scintillator which was a solution of 2% terphenyl and 0.1% POPOP in polystyrene. The energy yield was measured for scintillations due to Compton electrons produced by γ-rays from Cs 137. To determine the energy yield the authors analyzed pulses from a scintillation counter consisting of a photo-multiplier FEU-29 and a polished cylindrical scintillator of the above composition. The scintillator had a diameter of 30 mm and a height of 40 mm

Card 1/3

Determination of the Luminescence Energy Yield of Plastic Scintillators Subjected to γ-Rays

SOV/89-7-1-13/27

and it was attached to the photomultiplier cathode via a vaseline layer. The following equation was used to deduce the physical energy yield η from the height of pulses at the counter output:

$$V_{output} = (E_k \eta \alpha \bar{\varepsilon} M e / \varepsilon c), \quad (1)$$

where E_k is the energy of Compton electrons, ε is the energy of the emitted photons (2.80 eV), α is the ratio of the technical to the physical light yield (α = 0.1-0.3), $\bar{\varepsilon}$ is the mean efficiency of the photomultiplier cathode in the scintillation spectrum (~0.15), M is the amplification factor of the photomultiplier (~7.9×10^6), e is the electron charge, c is the capacitance of the preamplifier input (of the photomultiplier anode) which was about 30 pF, and ε is the amplification factor of the main amplifier (450 ± 10). The value of

Card 2/3

Determination of the Luminescence Energy Yield of Plastic Scintillators Subjected to γ-Rays SOV/51-7-1-13/27

the physical energy yield η, determined from Eq (1), was found to be $(1.7 \pm 0.3) \times 10^{-2}$. Acknowledgment is made to A.P. Kilimov for supply of the scintillator samples and information on their optical properties. There are 2 figures and 15 references, 4 of which are Soviet, 1 translation from English into Russian, 9 English and 1 Swiss.

SUBMITTED: August 30, 1958

Card 3/3

ACCESSION NR: AP4041055 S/0120/64/000/003/0214/0214

AUTHOR: Tsirlin, Yu. A.; Zalyubovskiy, I. I.; Sokolovskaya, T. I.; Neznamov, V. G.; Nikulina, R. A.

TITLE: Light response of CsI(Tl) crystal to proton and deuteron energy

SOURCE: Pribory* i tekhnika eksperimenta, no. 3, 1964, 214

TOPIC TAGS: CsI(Tl) crystal, CsI(Tl) crystal light response, proton energy, deuteron energy

ABSTRACT: The light response of CsI(Tl) crystals was measured in the 10—100 kev range on a Kharkov State University kevatron. The response P to protons was found to be lower than the response D to deuterons, the ratio D:P being about 1.3. The nonlinear segment of the curve lies below 25 kev. Orig. art. has: 1 figure.

ASSOCIATION: Vsesoyuzny*y nauchno-issledovatel'skiy institut monokristallov (All-Union Scientific-Research Institute of Single Crystals)

SUBMITTED: 05Jun63 ENCL: 00

SUB CODE: NP NO REF SOV: 000 OTHER: 003

Card 1/1

ACCESSION NR: AR4043996 S/0058/64/000/006/D073/D073

SOURCE: Ref. zh. Fizika, Abs 6D551

AUTHOR: Baturicheva, Z. B.; Tsirlin, Yu. A.

TITLE: Negative thermoluminescence of alkali halides

CITED SOURCE: Sb. Stsintillyatory* i stsintillyats. materialy*. Khar'kov, Khar'kovsk. un-t, 1963, 116-118

TOPIC TAGS: thermoluminescence, negative thermoluminescence, alkali halide, crystal cooling

TRANSLATION: Investigates the dependence of relative light yield on temperature in alkali-halide crystals of CsI-Tl and NaI-Tl with various activator concentrations. To exclude the influence of thermoluminescence the measurements were conducted during cooling of the crystal. The curve of the light-yield temperature dependence has step nature; on the thermoluminescence curve these steps correspond to the thermoluminescence maxima displaced somewhat toward higher temperatures.

Card 1/2

ACCESSION NR: AR4043996

The obtained regularity is ascribed to "negative" thermoluminescence of crystals, i. e., to the neutron capture, occurring during crystal cooling, from the capture-center conduction band; this results in decreased light yield. There is given a kinetic analysis of the process of negative thermoluminescence.

SUB CODE: IC, OP ENCL: 00

Card 2/2

TSIRLIN, Yu.A.; FEDOTOVA, S.A.

Furfurole content of artificially dewatered peat at the Boksitogorsk plant. Torf.prom. 36 no.8:13-15 '59.
(MIRA 13:3)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut gidroliznoy i sul'fitnospirtovoy promyshlennosti.
(Boksitogorsk--Peat) (Boksitogorsk--Furaldehyde)

S/051/60/008/04/018/032
E201/E691

AUTHORS: Tsirlin, Yu. A., Startsev, V.I. and Soyfer, L.M.

TITLE: Luminescent Properties of Caesium Iodide Crystals Grown from Superheated Melt

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 4, pp 537-540 (USSR)

ABSTRACT: Knoepfel, Loepfe, Stoll et al., (Refs 1-3) reported that CsI crystals grown from superheated (to 800-900°C) melts exhibit luminescence and have an α-yield of 9.3%. The present authors repeated Knoepfel, Loepfe, Stoll et al's work using analytically pure (Series 1), zone-refined (Series 2) and very pure (Series 3) CsI crystals. Crystals of Series 1 and 2 were found to contain 2.3×10^{-4}-2.7×10^{-5}% Tl; their absorption spectra (Fig 1) had a Tl band at 299 mμ. Series 3 crystals were subjected to chromatographic purification and quadruple re-crystallization; this treatment reduced the amount of Tl in them to below 10^{-7}% (Fig 2) and no scintillations were observed on excitation with γ-rays. Samples of each series were placed in carefully cleaned quartz ampules, which were evacuated, sealed and heated for up to 5 hours at 900°C. After such heating temperature of the melt was reduced and new crystals were grown at the rate

Luminescent Properties of Caesium Iodide Crystals Grown from Superheated Melt

of 3-5 mm/hour. The relative γ-scintillation yields of crystals of each series are shown in Fig 3. Series 1 yields rose with the duration of superheating to about 60% (after 5 hours heating), while those of Series 2 and 3 rose to over 10% after 1-2 hours and on further superheating fell to below 10%. The results obtained show clearly that luminescence produced by superheating cannot be due to thallium impurities, but it is probably caused by dissolution of quartz impurities and consequent activation of CsI with silicon; the hypothesis of Knoepfel, Loepfe, Stoll et al. that this luminescence is due to iodine vacancies was rejected by the authors. Acknowledgments are made to N.S. Budnik and L.G. Maystrenko for help in growing of crystals and measurements on them, and to A.N. Panova for obtaining the absorption spectra. There are 4 figures and 9 references, 4 of which are Soviet, 4 Swiss and 1 Italian.

SUBMITTED: July 13, 1959

Card 2/2

69275
S/051/60/008/04/019/032
E201/E691

24.3500

AUTHORS: Startsev, V.I., Baturicheva, Z.B. and Tsirlin, Yu.A.

TITLE: The Temperature Dependence of Luminescence of NaI(Tl) Crystals at Temperatures of 0-270°C.

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 4, pp 541-544 (USSR)

ABSTRACT: The reported (Refs 1-4) temperature dependences of the intensity of luminescence of NaI(Tl) are contradictory. The aim of the present work was to study the temperature dependence of the intensity of luminescence of NaI(Tl) with 0.05-0.1% Tl excited with γ-rays. The temperature dependence was obtained between 0 and 270°C at the rates of heating varying from 15 to 90 deg/hour. An NaI(Tl) crystal of 13 mm diameter and height (4 in Fig 1) was placed in an aluminium container 6 inside a copper block 3 which was joined by means of a copper rod with a heater. Temperatures were measured with a copper-constantan thermocouple and the temperature difference between the surface and the centre of the crystal did not exceed 2°C. A photo-multiplier 9 (FEU-19) was separated from the crystal by a plane-parallel glass plate 7 and it was air cooled. The crystal was excited with γ-rays from Cs^{137} (E_γ = 661 keV). Dependence of the anode current of the

Card 1/3

The Temperature Dependence of Luminescence of NaI(Tl) Crystals at Temperatures of 0-270°C

photomultiplier on the crystal temperature (integral measurements) was obtained by means of a microammeter M-91a across which a 10 μF capacitance was connected (this ensured that x = RC of the system was 4 sec). Alternately a pre-amplifier was connected to the photomultiplier anode and pulses from its output were fed to an oscillograph 25I and photographed (pulse measurements). The decay time was deduced from the form of the dependence of the pulse amplitude on the absolute temperature T and on x. After several heating-cooling cycles (Fig 2, curves 1 and 2; the intensity of luminescence was found to decrease linearly with rise of temperature at the rate of 0.12 ± 0.03 %/deg (Fig 2, curve 3). Luminescent properties of the crystals were not affected by the amount of thallium between 0.05 and 0.1%. At room temperature the main component of luminescence, amounting to 90-95% of the total signal, had a decay time τ_1 = 0.25 μsec; the remaining 5-10% of luminescence had a decay time τ_2 = 0.7-1.2 μsec. Dependence of the decay time τ_1 on temperature is shown in Fig 5. Theoretical dependences of the photomultiplier signal V on the absolute temperature T and on x = RC were calculated using $\tau(T)$ and $V_o(T)$, where V_o = lim V as RC → 0. The theoretical

Card 2/3

The Temperature Dependence of Luminescence of NaI(Tl) Crystals at Temperatures of 0-270°C

curves agreed satisfactorily with the authors' experimental results (Ref 3) and with the data of Webb and Johanson (Ref 2) and Kinard (Ref 3), but they differed from the results reported by Solon et al., (Ref 1) and by Meessen (Ref 4). There are 5 figures and 7 references, 1 of which is Soviet, 5 English and 1 French.

SUBMITTED: July 17, 1959

Card 3/3

S/051/60/008/005/017/027
E201/E491

AUTHORS: Daych, A.R., Tsirlin, Yu.A. and Pargamanik, L.E.

TITLE: Passage of Light Through Optical Waveguides

PERIODICAL: Optika i spektroskopiya, 1960, Vol.8, No.5, pp.713-720

TEXT: The authors discuss passage of light through cylindrical optical waveguides with specularly reflecting walls, using the geometrical-optics approximation. The discussion deals with the following cases: 1) waveguides with a light source of uniform intensity lying on the waveguide axis and with a source whose intensity is proportional to the cosine of the angle made with the waveguide axis; 2) waveguides with and without total reflection at its internal surfaces and also waveguides with the walls coated with a special reflecting layer; 3) waveguides for which absorption of light in the walls is neglected and waveguides for which this absorption is allowed for. The transmission coefficient is obtained for these cases and the dependence of this coefficient on the waveguide dimensions and conditions of reflection at the walls is discussed. The authors also compare waveguides of various types. The paper is entirely theoretical. There are 3 figures.

Card 1/2

S/051/60/008/005/017/027
E201/E491

Passage of Light Through Optical Waveguides

1 mathematical appendix and 14 references: 11 English, 2 French and 1 translation from German into Russian.

SUBMITTED: September 18, 1959

Card 2/2

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001757110020-7

SOURCE: Ref. zh. Fizika, Abs. 10A519

AUTHORS: [illegible] Yu. A., [illegible]

TITLE: Some problems [illegible]

[illegible] TAGS: scintillator, [illegible] polystyrene, terphenyl, [illegible] cylindrical plastic

Card 1/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001757110020-7"

L 16639-65
ACCESSION NR: AR5000772

SUB CODE: NP, OP

Card 2/2

MEL'NIKOV, N.P.; TSIRLIN, Yu.A.; FEDOTOVA, S.A.; BOBOVNIKOV, B.M.; IVANOVA, E.K.

Continuous neutralization of furfurole-containing vapors. Gidroliz. i lesokhim. prom. 16 no.7:20-23 '63. (MIRA 16:11)

1. Godudarstvennyy nauchno-issledovatel'skiy institut gidroliznoy i sul'fitnospirtovoy promyshlennosti (for Mel'nikov, TSirlin, Fedotova). 2. Andizhanskiy gidroliznyy zavod (for Bobovnikov, Ivanova).

Distillation of furfural [illegible]

TABLE OF CONTENTS [abridged]:

L 16479-65
ACCESSION NR AM4045082

SUB CODE: GC SUBMITTED: 28Feb64 NR REF SOV: 005

OTHER: 044

Card 2/2

L 15958-66 EWT(m)/EWP(j)/T WW/RM

ACC NR: AP6001485 SOURCE CODE: UR/0368/65/003/006/0571/0573

AUTHOR: Tsirlin, Yu. A.; Sokolovskaya, T. I.; Nikulina, R. A ; Nagornaya, L. L. Malkes, L. Ya.; Shubina, E. V.

ORG: None

TITLE: Plastic scintillator with a light yield proportional to the energy of outer electrons

SOURCE: Zhurnal prikladnoy spektroskopii, v. 3, no. 6, 1965, 571-573

TOPIC TAGS: scintillation, polystyrene, vinyl plastic, electron emission

ABSTRACT: Earlier studies of plastic scintillators investigated the relationship between the light yield and the energy of inner (I. M. Rozman et al., PTE, 6, 27, 1960) and outer (Yu. A. Tsirlin et al., ZhPS, 3, 156, 1965) electrons. The present study attempts to establish the amount of additives (PBE, BPO, or PPP) which will result in the highest degree of proportionality defined as $(L/E)_{30\ kev}/(L/E)_{70kev}$ 100 (L - light yield, E - incident energy). The polystyrene + 1% PBE showed the highest light yield in the 0—20 kev region and it was, at the same time, proportional to the energy of the outer electrons. It is thus very convenient for the detection of low energy electrons. The other base tested was polyvinylxylene

Card 1/2 UDC: 535.35

L 15958-66
ACC NR: AP6001485

which yielded a somewhat weaker degree of proportionality. Orig. art. has: 1 formula, 2 figures, and 2 tables.

SUB CODE: 07 / SUBM DATE: 02Nov64 / ORIG REF: 002

18/

Card 2/2

L 16436-65 EPA(s)-2/EWT(m)/EWP(t)/EWP(b) Pt-10 IJP(c)/ASD(f)-2 JD/JG
ACCESSION NR: AP4048734

AUTHORS: Baturicheva, Z. B.; Gurevich, N. Yu.; Tsirlin, Yu. A.; Shvets, V. A.

TITLE: Effect of plastic deformation on the light yield of NaI(Tl) crystals

SOURCE: Optika i spektroskopiya, v. 17, no. 5, 1964, 737-738

TOPIC TAGS: scintillator, plastic deformation, light yield

ABSTRACT: The purpose of the investigation was to determine the cause of the reduction in the light yield of a gamma-excited plastically deformed NaI(Tl) crystal with [illegible]% Tl concentration by weight. The plastic deformation was [illegible] wise. The samples in the form of plates [illegible] x 10 mm were packed in special containers with a reflector made of aluminized dacron film, which served also as the container wall on the gamma-irradia-

Card 1/3

L 16436-65
ACCESSION NR: AP4048746

tion side. The light yield was measured relative to the characteristic copper Kα line with a scintillation counter consisting of an FEU-23 photomultiplier and [illegible] AAIDO-1 differential analyzers, one of which [illegible] [illegible] source by an integral method, using a FEU-29 photomultiplier and an M-95 microammeter. The experiments were performed at 25C. The absorption of the crystals was measured in the 500--1100 nm range with an SF-4 spectro[illegible] [illegible] stress. It [illegible] that not all the decrease in light yield is due to the increase in the absorption in the crystals, and that some of the decrease is due to a trapping of the luminescence centers by vacancies. Orig. art. has: 2 figures.

Card 2/3

L 16436-54
ACCESSION NR: AP4048746

ASSOCIATION: None

SUBMITTED: 06Jan64 ENCL: 00

SUB CODE: OP NR REF SOV: 001 OTHER: 001

Card 3/3

TITLE: [illegible]

SOURCE: Optika i spektroskopiya, v. 17, no. 5, 1964, 776-783

TOPIC TAGS: [illegible] light reflection, diffusive motion

ABSTRACT: This is a [illegible] paper to earlier work by the authors [illegible]

18 formulas.

ASSOCIATION: None

L 10430-65
ACCESSION NR: AP4048753

SUB CODE: OP NR REF SOV: 003 OTHER: 004

Card 3/4

ACCESSION NR: AP4048733

ENCLOSURE: 01

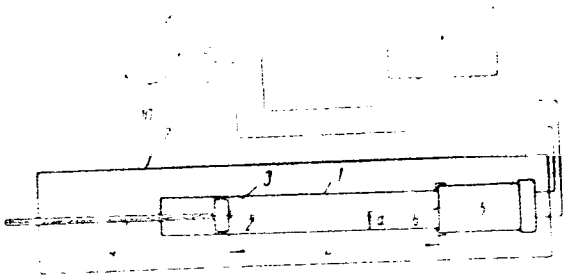
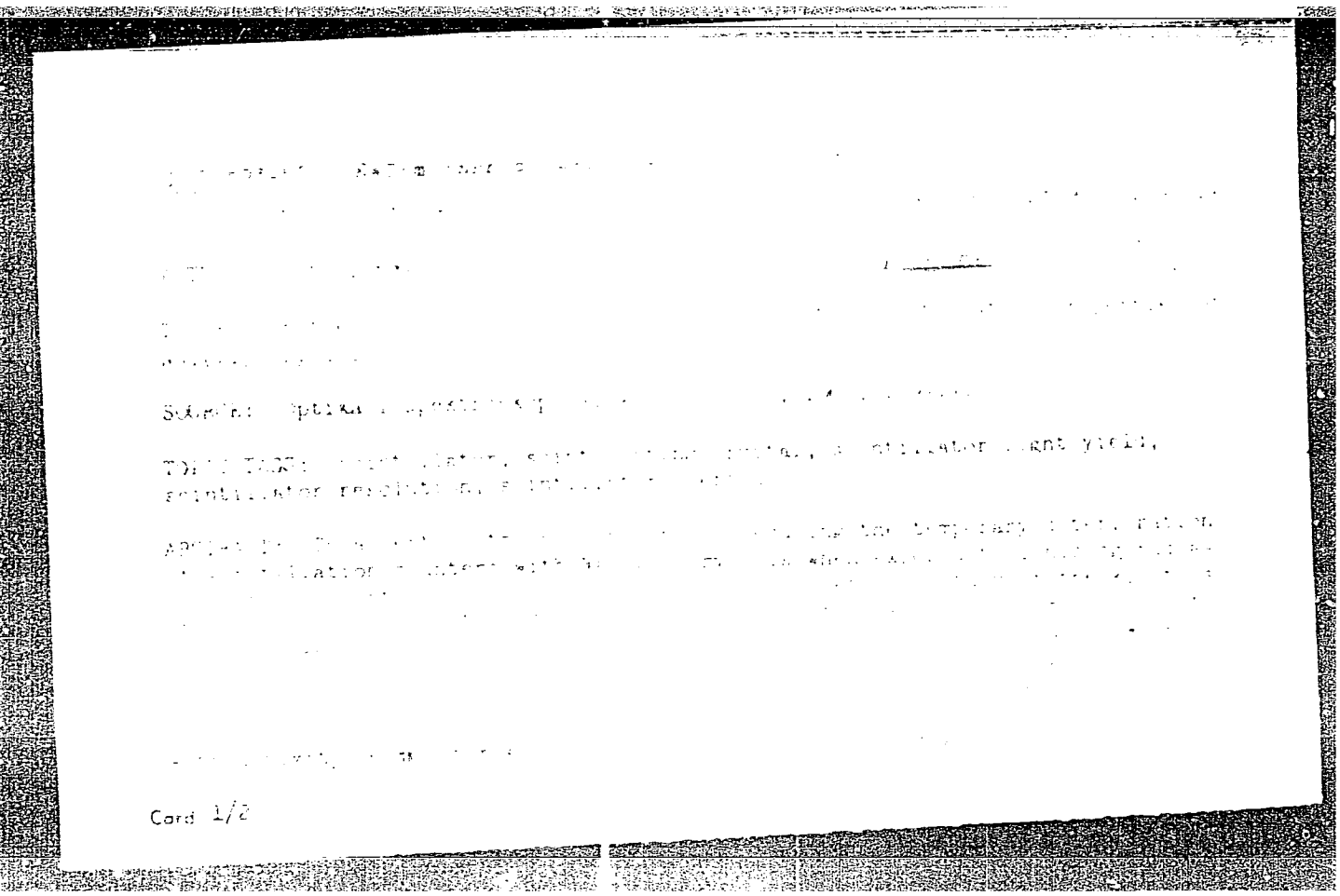


Fig. 1. Diagram of set-up for the measurement of light transmission

Card 4/4



Card 1/2

L 22893-65

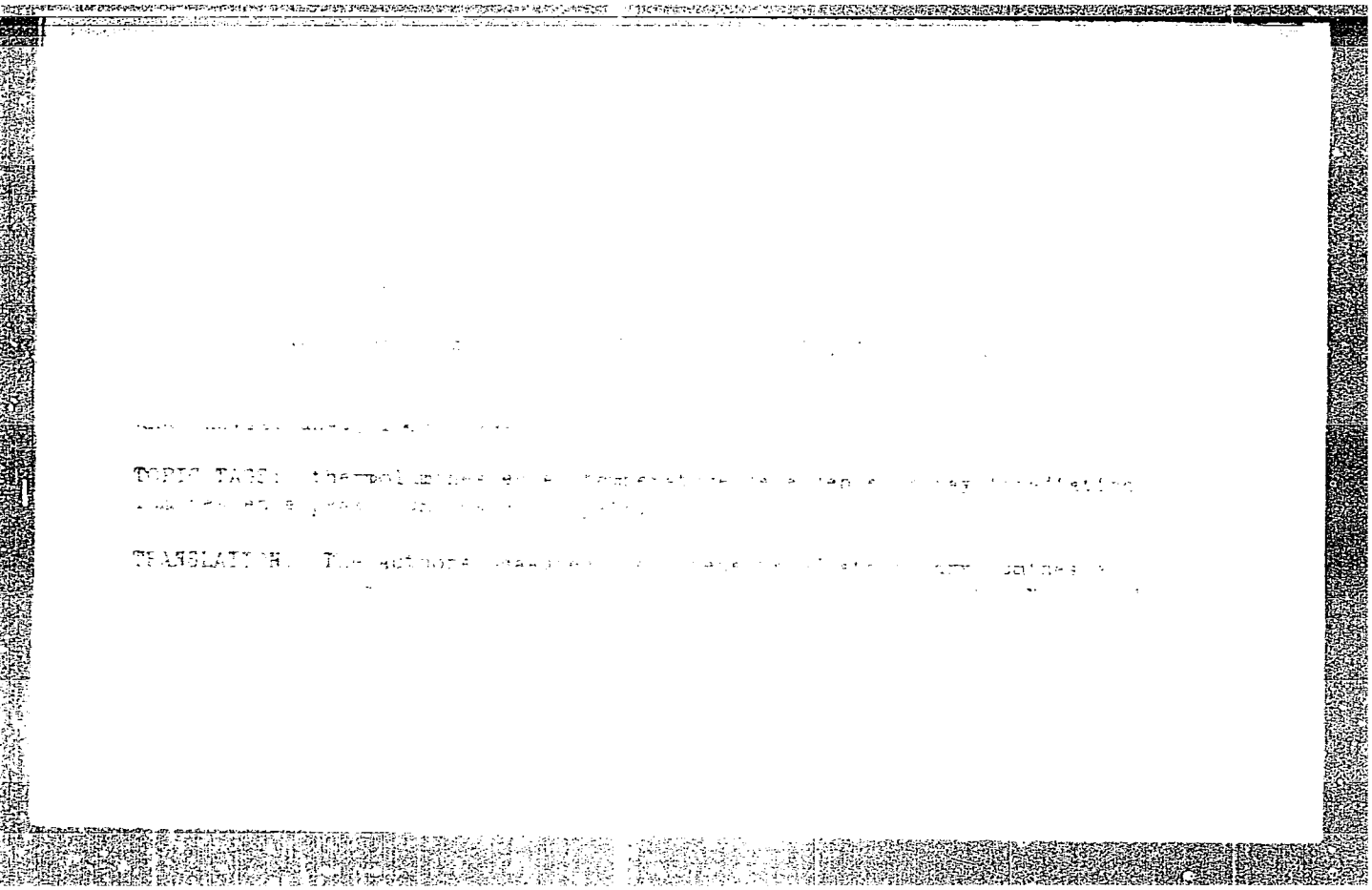
ACCESSION NR: AP5

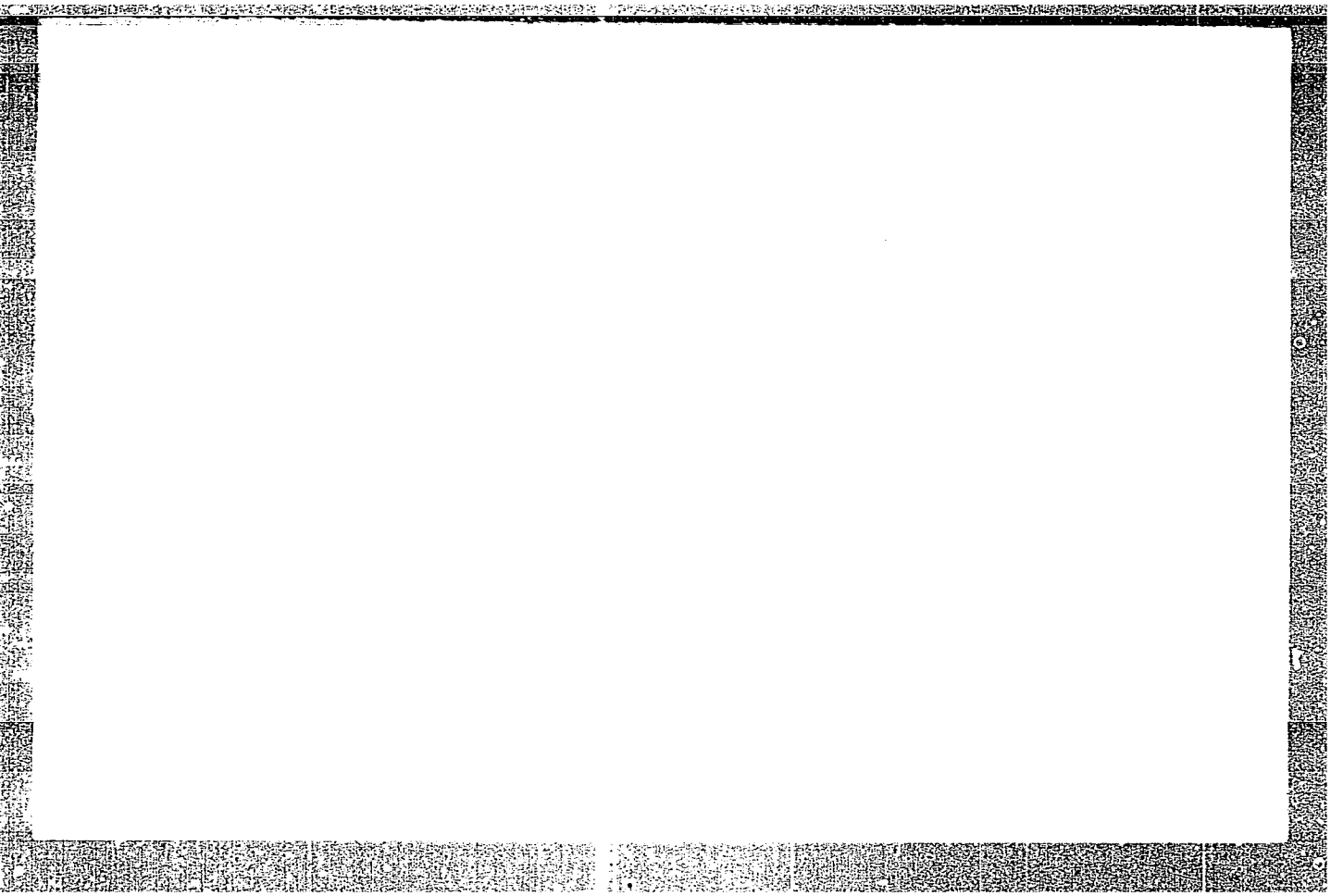
ASSOCIATION: None

SUBMITTED: 06Jan64 ENCL: 00 SUB CODE: NP, OP

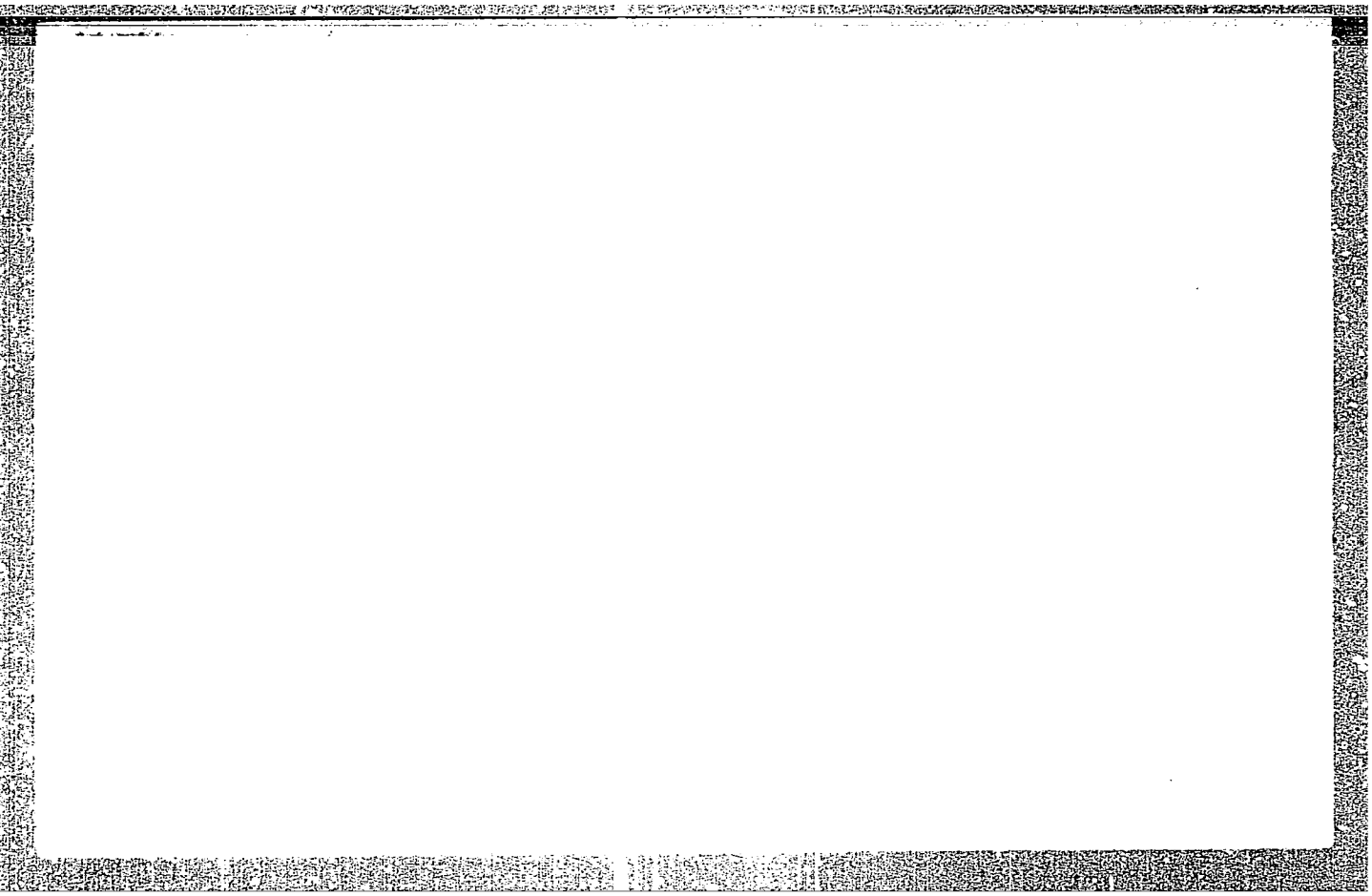
NR REF SOV: 001 OTHER: 000

Card 2/2





APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001757110020-7"



APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001757110020-7"

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001757110020-7"

L 22082-66 EWT(m)/EPF(n)-2/T/EWP(t) IJP(c) JD/JG

ACC NR: AP6012994 SOURCE CODE: UR/0089/65/018/002/0193/0194

AUTHOR: Bakradze, R. V.; Tsirlin, Yu. A.

ORG: none

55
B

TITLE: Conference on the physics and technology of scintillators based on alkaline halogenides

SOURCE: Atomnaya energiya, v. 18, no. 2, 1965, 193-194

TOPIC TAGS: scintillation, radioluminescence, single crystal, electron hole, physics conference, alkali halide, x ray irradiation

ABSTRACT: The goal of the conference, held in Khar'kov in April, 1964 was a search for paths for increasing the scintillation effectiveness and resolving capacity of alkaline-halogen type monocrystals. It was reported to the conference that the scintillation effectiveness reached in the USSR and abroad are considerably below theoretical values, primarily due to inertial and migration losses. Results of investigations presented supported the correctness of the dual (exiton and electron-hole) mechanism of energy transmission of NaI (Tl). Reports were also presented on the radioluminescence phenomenon in tallium activated crystals, on thermal, thermo-optical irradiation and excited absorption of X-ray irradiated NaI (Tl) crystals, on the investigation of excitation spectra and kinetic characteristics of

Card 1/2

L 22082-66

ACC NR: AP6012994

NaI monocrystals containing cation and anion additives, a survey of works by the all union science research institute on monocrystals on the development of the technology of manufacture of spectrometric NaI (Tl) crystals or large sizes, the surface activity of alkaline halogens, as well as questions on the production of the raw materials for scintillators and related technology. Orig. art. has: 1 table. [JPRS]

SUB CODE: 20 / SUBM DATE: none

Card 2/2 BLG

BATURICHEVA, Z.B.; GUREVICH, N.Yu.; TSIRLIN, Yu.A.; KOSTENKO, N.S.

Thermoluminescence of NaI (Tl) crystals. Ukr. fiz. zhur. 10 no.3:348-350 Mr '65. (MIRA 18:6)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut monokristallov, Khar'kov.

TSIRLIN, Yu.A.; YASINSKAYA, A.A.; IVANOVA, E.K.

Single-column circuit for continuous vacuum rectification of crude furfurole. Gidroliz. i lesokhim.prom. 18 no.4:4-7 '65.
(MIRA 18:6)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut gidroliznoy i sul'fitno-spirtovoy promyshlennosti (for TSirlin, Yasinskaya).
2. Andizhanskiy gidroliznyy zavod (for Ivanova).

BAKRADZE, R.V.; TSIRLIN, Yu.A.

Conference on the Physics and Technology of Scintillators on the Basis of Alkali Halides. Atom. energ. 18 no.2:193-194 F '65. (MIRA 18:3)

PARGAMANIK, L.E.; STRZHEMECHNYY, M.A.; TSIRLIN, Yu.A.

Passage of light through a dispersion detector. Zhur. prikl. spektr. 2 no.5:440-446 My '65. (MIRA 18:7)

L 53709-65 EWG(j)/EWT(m)/EPF(c)/EWP(j)/EWA(h)/EWA(j) Pc-4/Pr-4/Pab EM
ACCESSION NR: AP5011236 UR/0241/65/010/004/0073/0074
615.849.7-015.35

41
40
0

AUTHOR: Vershinina, S. P.; Zaplesnichenko, G. P.; Kolesnikov, L. N.; Skuratovskaya, Zh. V.; Chernobay, A. V.; Tsirlin, Yu. A.

TITLE: New scintillation materials for X- and gamma radiation dosimetry

19

SOURCE: Meditsinskaya radiologiya, v. 10, no. 4, 1965, 73-74

TOPIC TAGS: gamma radiation, X ray, dosimetry, scintillation detector

ABSTRACT: A number of scintillation detectors made of scintillating plastic and other substances were tested. The best of the combined detectors were those consisting of scintillating plastic plus silver-activated zinc sulfide, thallium-activated potassium iodide, thallium-activated cesium iodide, potassium bromide, sodium chloride, tetraphenyl-lead, and tetraphenyl-tin. These detectors can be effectively used to monitor gamma radiation ranging from 0.03 to 3 Mev. Orig. art. has: 1 table.

Card 1/2

L 53749-65
ACCESSION NR: AP5011236

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut monokristallov, stsintillyatsionnykh materialov i osobo chistykh khimicheskikh veshchestv, Kharkov (All-Union Scientific Research Institute of Monocrystals, Scintillation Materials and Especially Pure Chemical Substances)

SUBMITTED: 20Mar64 ENCL: 00 SUB CODE: LS

NO REF SOV: 001 OTHER: 001

Card 2/2

TSIRLIN, Yu.A.; DOVEDOVA, A.S.

Investigating the channel type nonbubbling plates. Sbor.trud.NIIGS 12:155-164 '64. (MIRA 18:3)

TSIRLIN, Yu.A.; ZALYUBOVSKIY, I.I.; SOKOLOVSKAYA, T.I.; NEZNAMOV, V.G.
NIKULINA, R.A.

Dependence of the luminous yield of CsI(Tl) crystals on the proton and deuteron energy. Prib. i tekh. eksp. 9 no.3:214 My-Je '64 (MIRA 18:1)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut monokristallov.

BATURICHEVA, Z.B.; GUREVICH, N.Yu.; TSIRLIN, Yu.A.

Effect of pre-irradiation on the scintillation properties of NaI(Tl) crystals. Opt. i spektr. 18 no.1:139-141 Ja '65.
(MIRA 18:4)

L 8213-66 EWT(l)/EWT(m)/EWP(j)/EWA(h)/EWA(l) IJP(c) WW/GG/BM

ACC NR: AP5013864 SOURCE CODE: UR/0368/65/002/004/0371/0373

44,55 44,55 44,55 44,55

AUTHOR: Tsirlin, Yu. A.; Daych, A. R.; Sokolovskaya, T. I.; Nagornaya, L. L.

ORG: none

TITLE: Determining the effective coefficient of light absorption in long plastic scintillators

SOURCE: Zhurnal prikladnoy spektroskopii, v. 2, no. 4, 1965, 371-373

21, 44, 55

TOPIC TAGS: scintillator, light absorption, gamma luminescence, luminescent material

ABSTRACT: It is shown that the attenuation in the scintillator material of light emitted by that scintillator may be determined only by measuring the luminescence spectrum, spectral sensitivity of the photocathode which detects the radiation, and spectral coefficient of absorption of the scintillator material throughout the entire range of wavelengths emitted by the scintillator. An experimental method is described for direct determination of the "effective" coefficient of absorption. The transmittance of α-stimulated light is measured in long cylinders of scintillation plastic. In a second set of experiments, the transmittance of light stimulated by a collimated beam of γ-rays is measured. The results are given in graphic form. A formula is derived for the transmission factor as a function of length. Orig. art. has: 3 figures, 5 formulas.

SUB CODE: OP,MT/ SUBM DATE: 16Sep64/ ORIG REF: 006/ OTH REF: 000

nw

Card 1/1 UDC: 535.344

L 5449-66 EWT(1)/EPA(s)-2/EWT(m)/T/EWP(t)/EWP(b) IJP(c) JG/JD/GG
ACCESSION NR: AP5019757 UR/0051/65/019/002/0242/0246
535.373.1

AUTHOR: Baturicheva, Z. B.; Gurevich, N. Yu.; Tsirlin, Yu. A. 57 B

TITLE: Concerning some trapping centers in NaI(Tl) crystals

SOURCE: Optika i spektroskopiya, v. 19, no. 2, 1965, 242-246

TOPIC TAGS: sodium compound, scintillator, thermoluminescence, crystal defect, electron trapping, x ray irradiation, light absorption

ABSTRACT: The authors studied thermoluminescence and thermo-optical luminescence and induced absorption in x-irradiated NaI(Tl) crystals for the purpose of determining the nature and concentrations of the defects which serve as traps for electrons and holes, thereby affecting adversely the scintillation properties of the NaI(Tl). The investigated microcrystals were grown by the Stockbarger method, with Tl concentrations 10^{-5}--10^{-1} wt.%. Platelets of NaI(Tl) measuring 1 x 10 x 10 mm were then cleaved and plastically deformed in a cryostat, in which all the optical measurements were carried out. The measurement procedure and equipment are described in some detail. The measurements indicate that x-irradiation of NaI(Tl) crystals containing ~0.1 wt.% Tl at room temperature reduces the absorption of the dual Tl centers, thus leading to the production of dual trapping centers. Similar

Card 1/2 0901099

L 5449-66

ACCESSION NR: AP5019757

trapping centers are produced by thermal microdefects in the lattice. It is shown by comparison of the dependence of the thermoluminescence and thermo-optical luminescence on the time, the stress, and the temperature that the two types of traps compete in the capture of electrons at temperatures higher than room temperature, and this competition can account for some features of the behavior of the luminescence in x-irradiated NaI(Tl). Orig. art. has: 6 figures and 2 formulas.

ASSOCIATION: none

SUBMITTED: 06Jan64 ENCL: 00 SUB CODE: SS, OP

NR REF SOV: 005 OTHER: 004

Card 2/2

L 3157-66 EWT(1)/EPF(c) IJP(c) WW/GG

ACCESSION NR: AP5016048 UR/0368/65/002/005/0440/0446

535.376

AUTHORS: Pargamanik, L. E.; Strzhemechnyy, M. A.; Tsirlin, Yu. A.

TITLE: Passage of light through a dispersed detector

SOURCE: Zhurnal prikladnoy spektroskopii, v. 2, no. 5, 1965, 440-446

TOPIC TAGS: light transmission, scintillation detector, light diffusion, light dispersion

ABSTRACT: This is a continuation of earlier work by the authors (Opt. i spektr. v. 12, 304, 1962), where it was shown that the propagation of the light of scintillations produced in a layer of dispersed detector can be treated as a process of photon diffusion and described with the aid of the diffusion equation. Whereas the earlier investigation was devoted to propagation of light through the thin layer from a source located on the boundary or outside the layer, in the present paper the authors consider the propagation of scintillations produced inside a layer of finite thickness, bounded by surfaces with different

Card 1/2

L 3157-66

ACCESSION NR: AP5016048

reflection coefficients. The scintillation light is produced by ionization and is recorded with photomultiplier having a constant integration time. Two limiting cases, when the integration time is much larger than or much smaller than the time interval between successive scintillations, are considered. In the first case, the problem consists of finding the optimal coefficient of light gathering, and in the second it consists of finding the optimal light flux density through the boundary. The results are found to be in satisfactory agreement with the experimental data on ZnS(Cu) scintillator. Orig. art. has: 2 figures, 14 formulas, and 1 table.

ASSOCIATION: None

SUBMITTED: 06Jul64 ENCL: 00 SUB CODE: OP

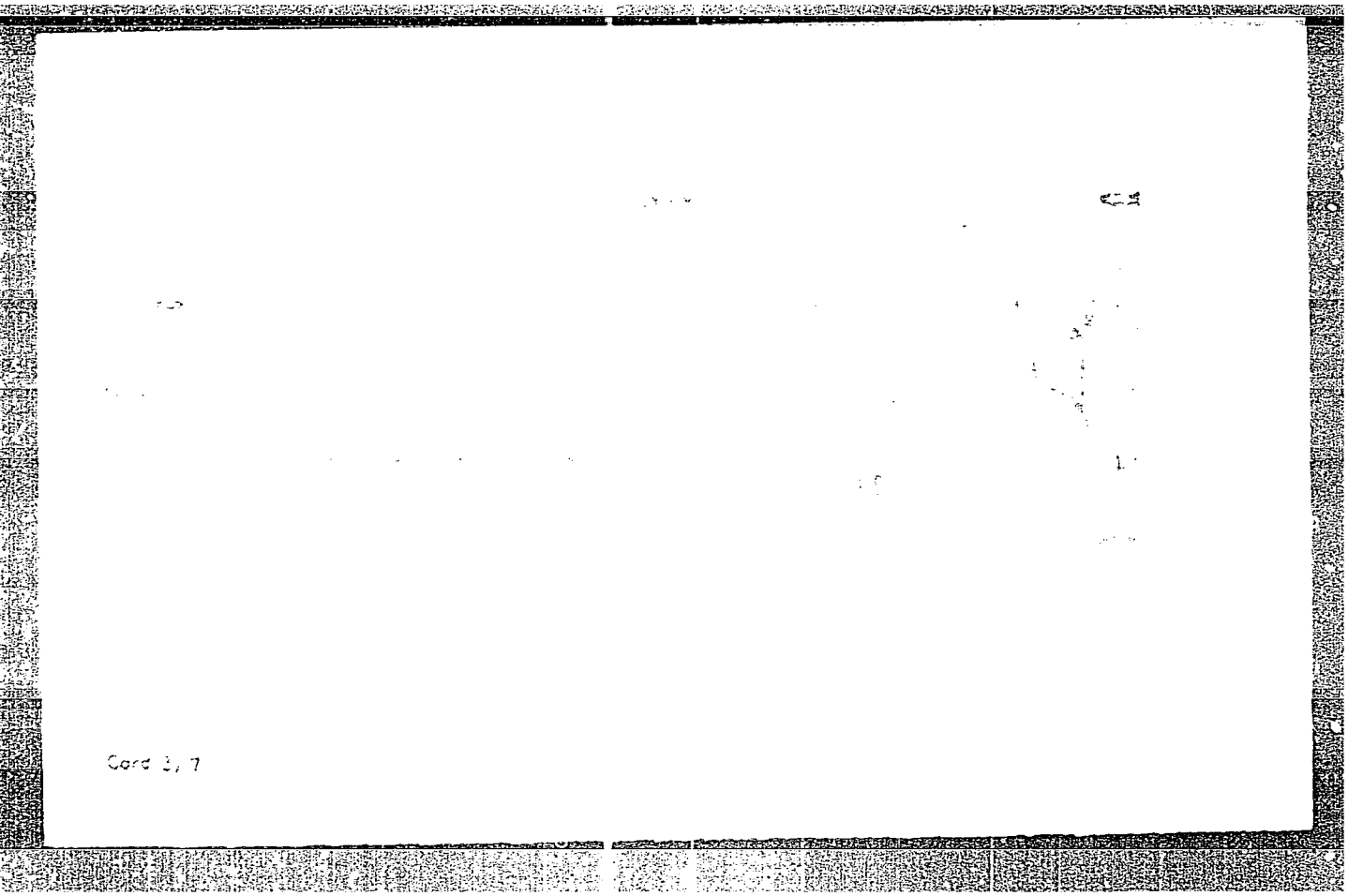
NR REF SOV: 002 OTHER: 001

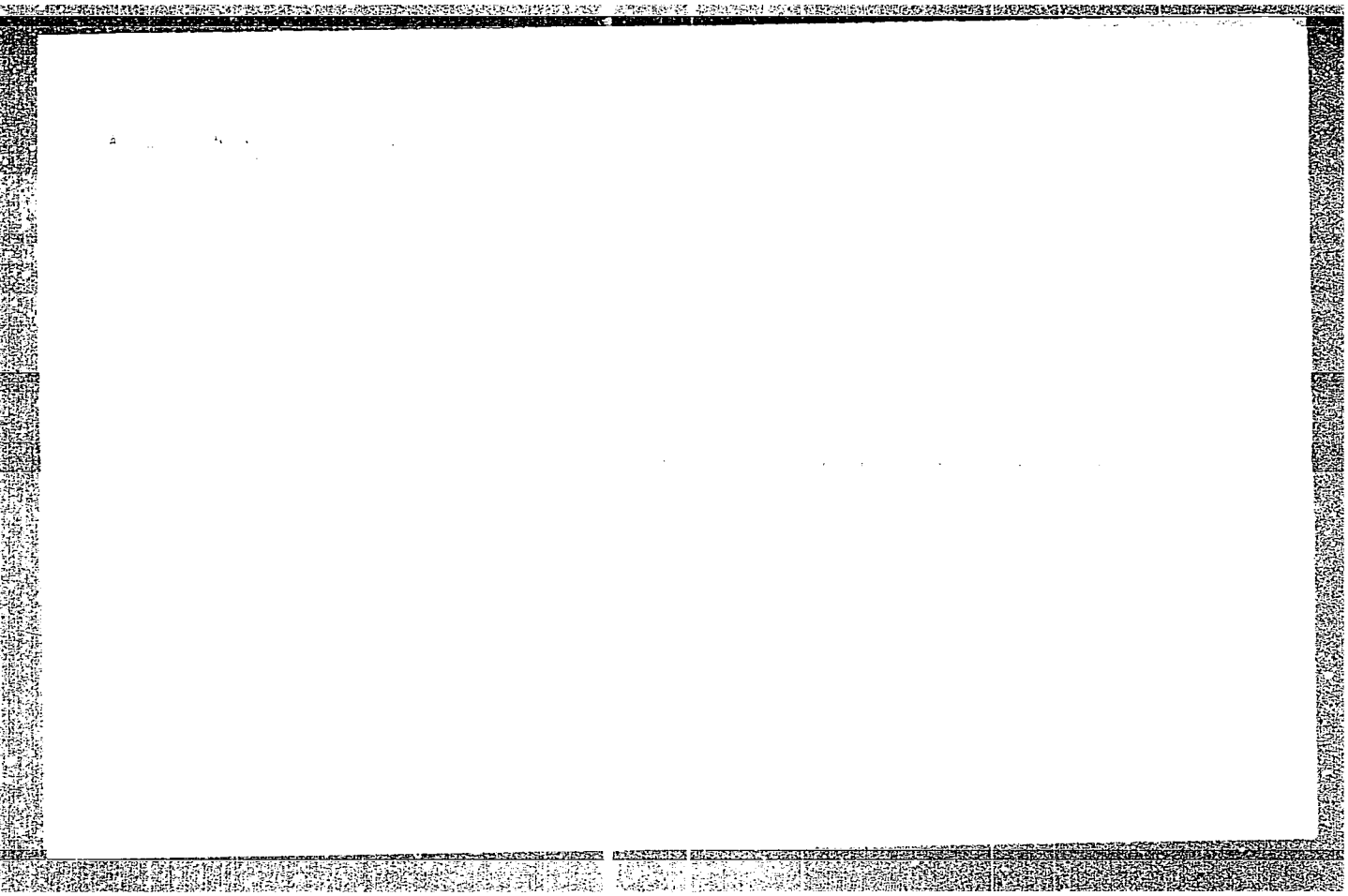
Card 2/2

TOPIC TAGS: scintillator, polystyrene, thermoplastic material, luminescent material

ACTION NP AP5021493

fic light output L/E is a variable in the low energy range from 0 to 70 kev. It





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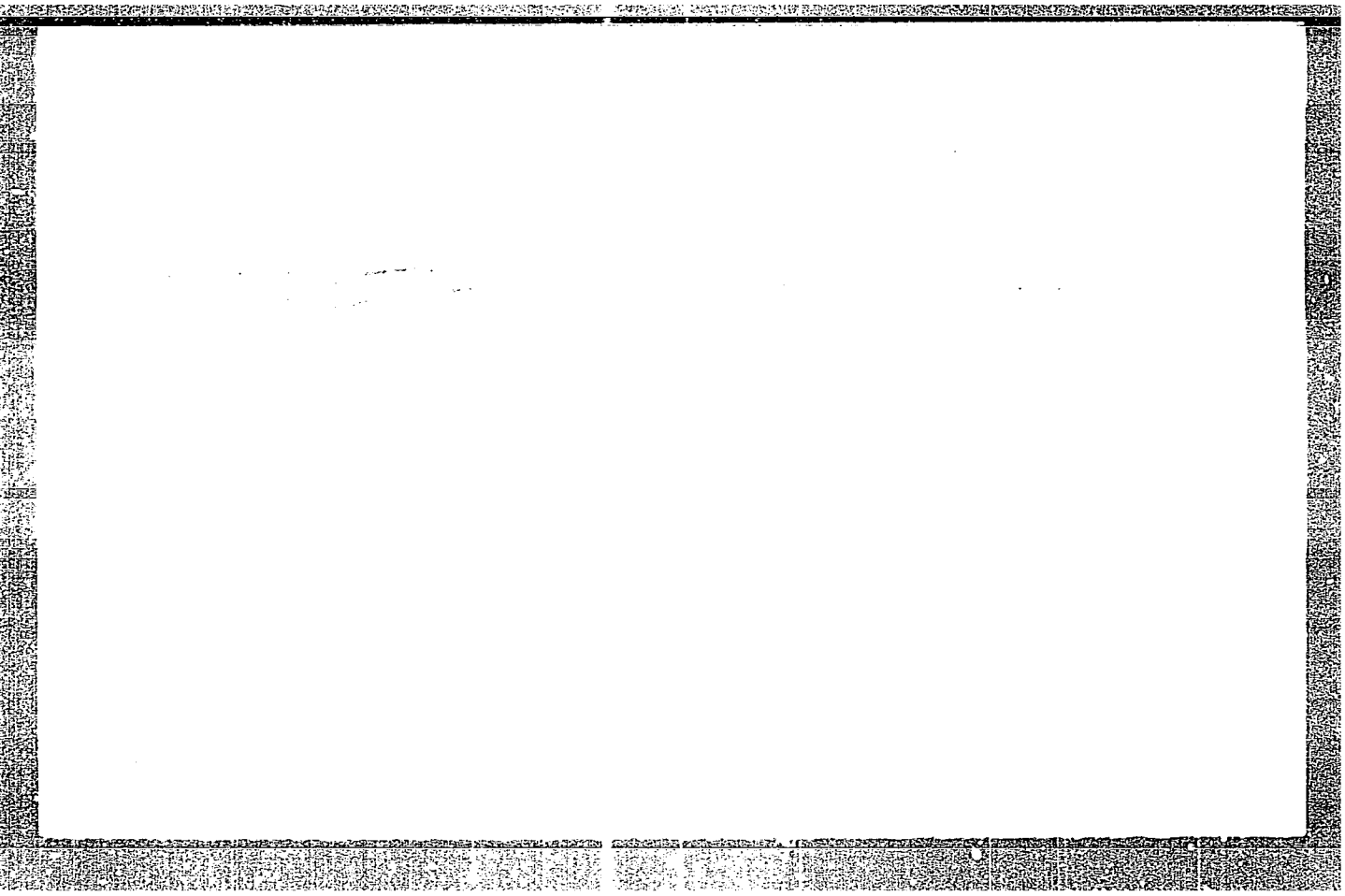

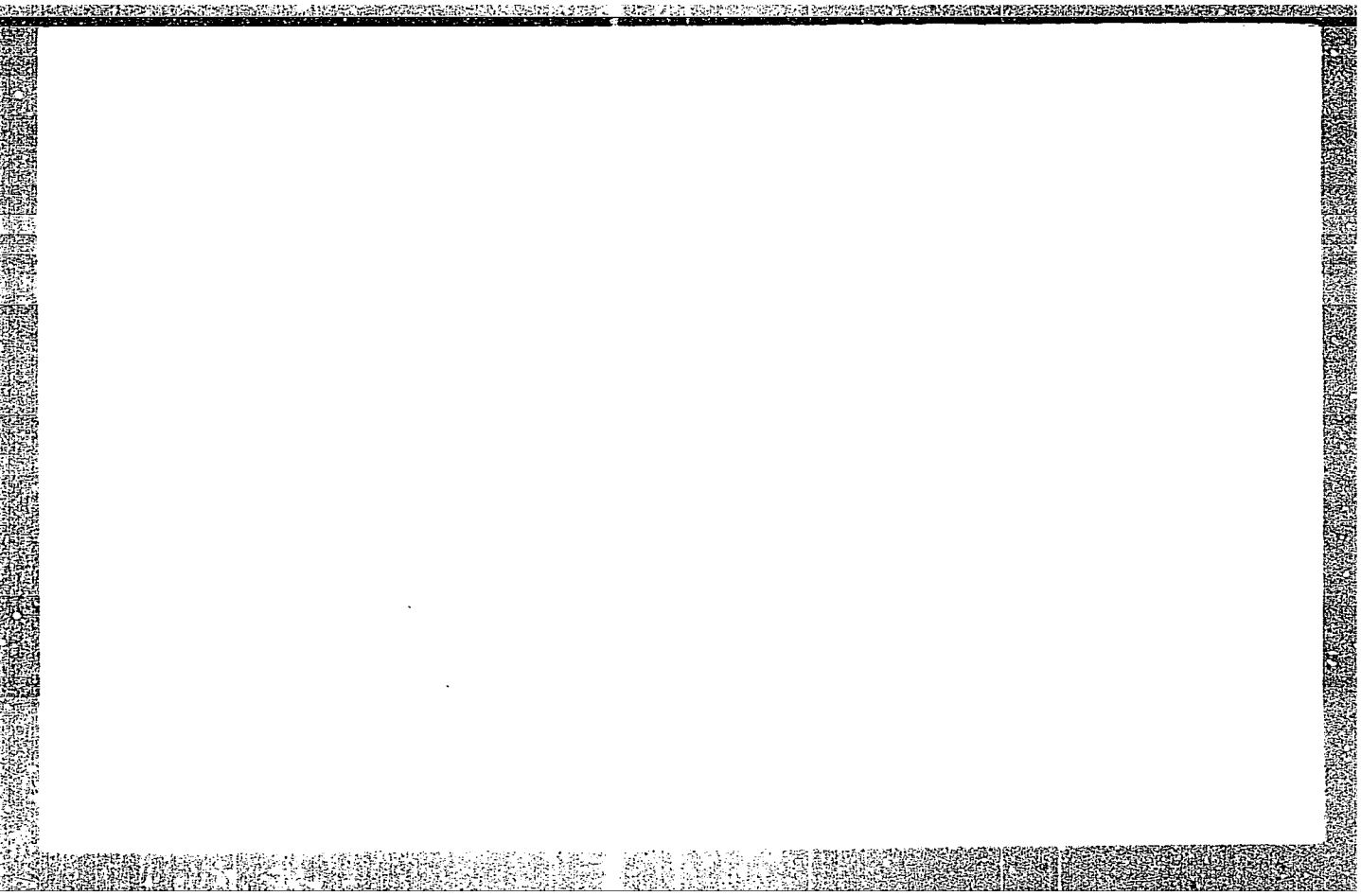

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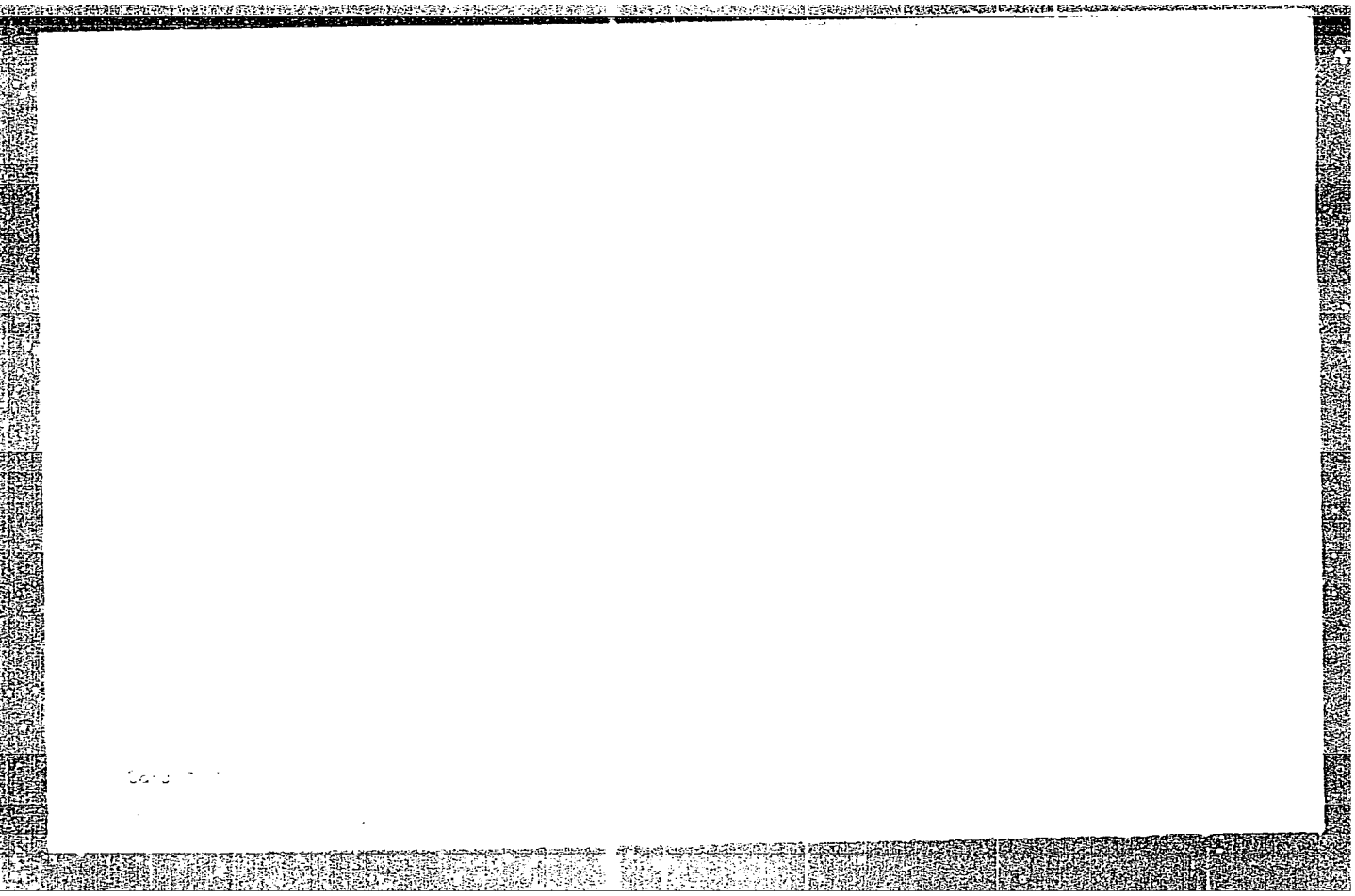

L 5455-66 EWT(l)/EWT(m)/T/EWP(t)/EWP(b) IJP(c) JD/JG/GG

ACC NR: AP5025097 SOURCE CODE: UR/0368/65/003/003/0282/0284

AUTHORS: Baturicheva, Z. B.; Gurevich, N. Yu.; Tsirlin, Yu. A. 77 68 B

ORG: none

TITLE: On the influence of plastic deformation on the storage of light quantity in crystals of NaI(Tl) [Reported at the 12th Conference on Luminescence in L'vov]

SOURCE: Zhurnal prikladnoy spektroskopii, v. 3, no. 3, 1965, 282-284

TOPIC TAGS: luminescence, luminescence research, luminescence crystal, luminescence spectrum, lithium iodide, sodium iodide

ABSTRACT: The thermal and thermooptical scintillation curves for NaI-(Tl) crystals containing various concentrations of Tl were determined. The excitation was realized by means of x-rays at room temperature. The heating rate was 0.8 degrees/sec, and the crystals were deformed by means of a vise. The experimental results are presented graphically (see Fig. 1). From these experimental results it is concluded that the temporal integral stored in NaI(Tl) crystals, x-rayed at room temperature, is mainly due to thallium capture centers. This conclusion

Card 1/3

UDC: 535.377

0901 0041

L 5455-66

ACC NR: AP5025097

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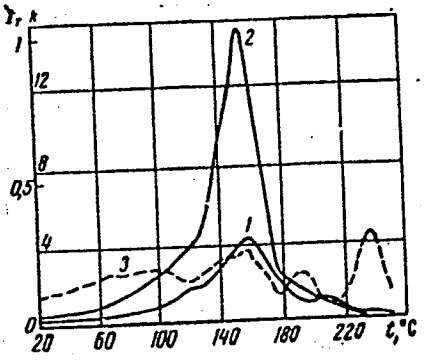


Fig. 1. Thermoscintillation curves I_T (relative units) for nondeformed (1) and deformed, by 10% (2) NaI(Tl) crystals, and the temperature dependence k (3), equal to the ratio of thermoscintillation intensity of deformed to nondeformed crystals

is in agreement with the data of R. A. Kink 44,55 and G. G. Liyd'ya 44,55 (Trudy IFA AN ESSR, 44,54

Card 2/3

L 5455-66
ACC NR: AP5025097

23, 109, 1963). Deformed and nondeformed crystals of LiI(Tℓ) showed a similar behavior. On the other hand, crystals of CsI(Tℓ) and KI(Tℓ) exhibited a different behavior. For these crystals the stored temporal integral increased with increase in plastic deformation. This fact is attributed to a destruction of the capture centers associated with thermal microlattice defects. Orig. art. has: 3 graphs.

SUB CODE: OP, SS / SUBM DATE: 05Jan65/ ORIG REF: .002

Card 3/3 hcd

VERSHININA, S.F.; ZAPLESNICHENKO, G.P.; KOLESNIKOV, L.N.; [illegible], Zh.V.; CHERNOBAY, A.V.; TSIRLIN, Yu.A.

New scintillating materials used in x-ray and γ-ray dosimetry. Med. rad. 10 no.4:73-74 Ap '65. (MIRA 18:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut monokristallov, stsintillyatsionnykh materialov i osobo chistykh khimicheskikh veshchestv, Khar'kov.

BATURICHEVA, Z.B.; GUREVICH, N.Yu.; TSIRLIN, Yu.A.

Effect of ionic processes on the thermal breakdown of trapping centers in NaI (Tl). Ukr. fiz. zhur. 10 no.5:570-571 My '65. (MIRA 18:5)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut monokristallov, Khar'kov.

BATURICHEVA, Z.B.; GUREVICH, N.Yu. [Hurevych, N.IU]; TSIRLIN, Yu.A. [TSyrlin, IU.A.]

Effect of prior illumination on the scintillation characteristics of NaI (Tl) crystals. Ukr. fiz. zhur. 10 no.6:686-687 Je '65. (MIRA 18:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut monokristallov, Khar'kov.

GRUDSKAYA, L.Ye.; ZAKHARIN, Ya.A.; TSIRLIN, Yu.A.; SHIRAN, N.V.; SHAKHOVA, K.V.

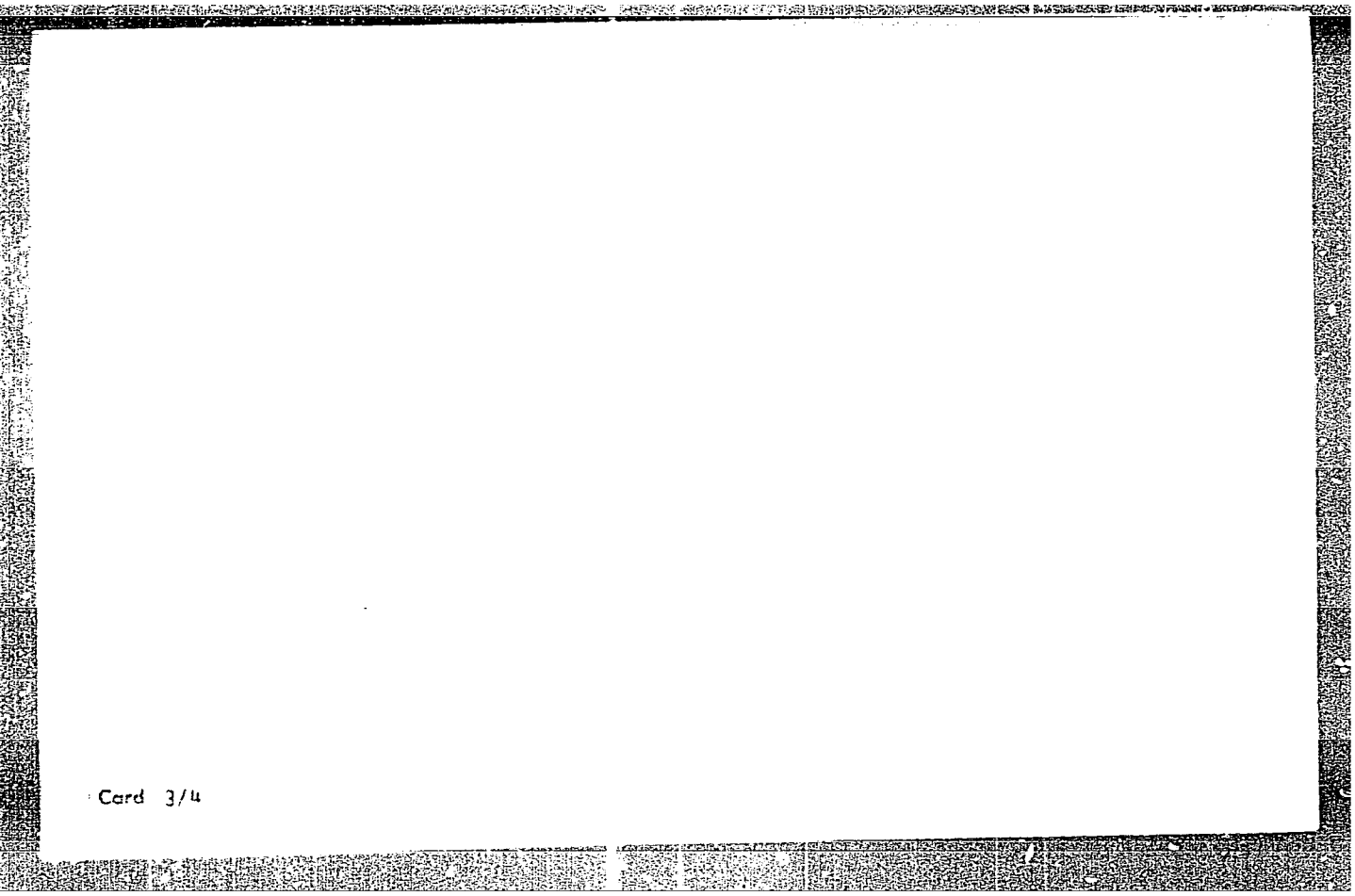
Determining the possibility of discriminating particles of different ionization density by the pulse shape in LiI(Tl), LiI(Eu), and CsI(In) crystals. Opt. i spektr. 18 no.3:450-452 Mr '65. (MIRA 18:5)

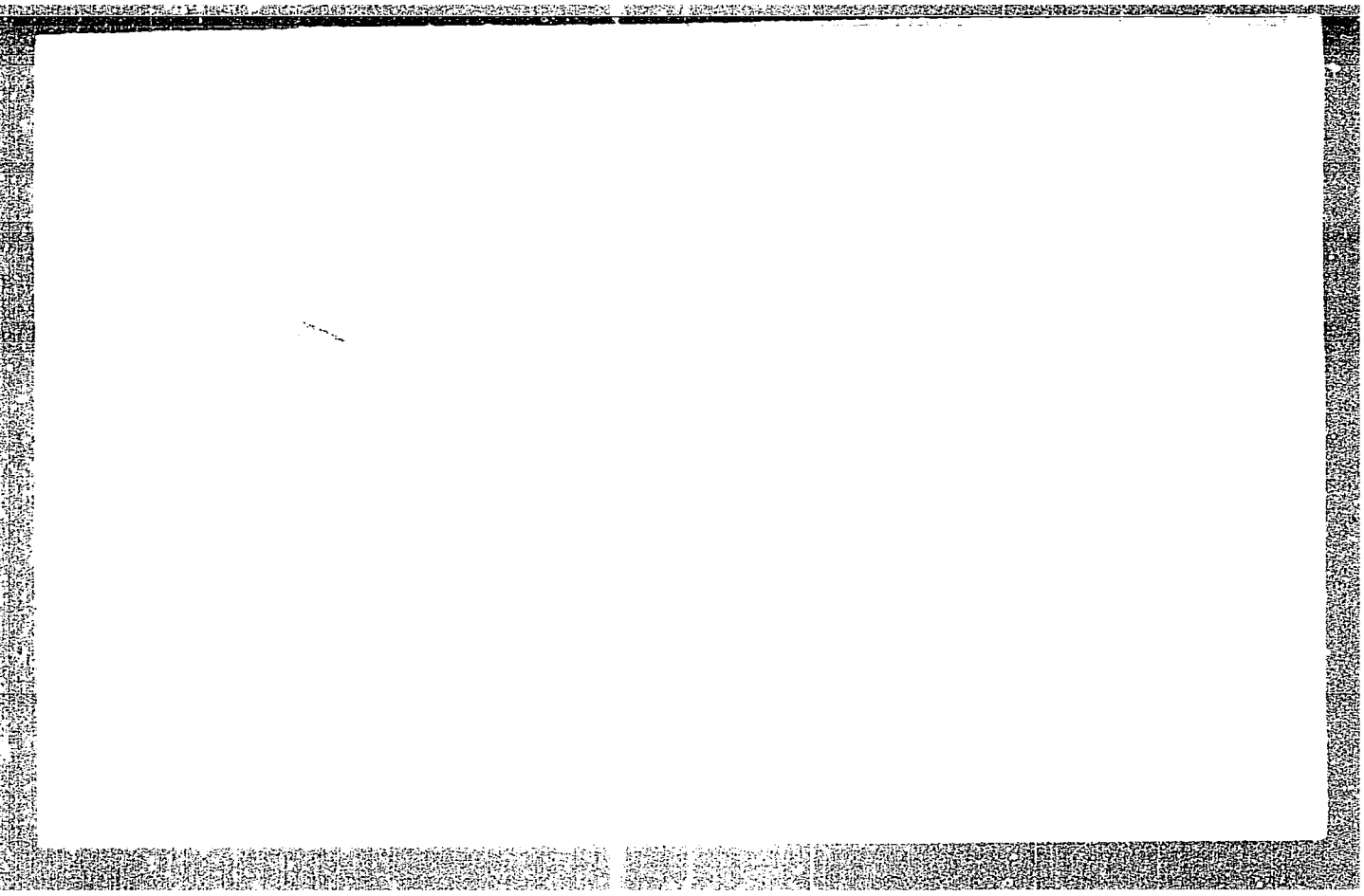
BATURICHEVA, Z.B.; GUREVICH, N.Yu.; TSIRLIN, Yu.A.

Trapping centers in NaI (Tl) crystals. Opt. i spektr. 19 no.2:242-246 Ag '65. (MIRA 18:8)

AUTHOR: Daych, A. R.; Tsirlin, Yu. A.

Card 2/4





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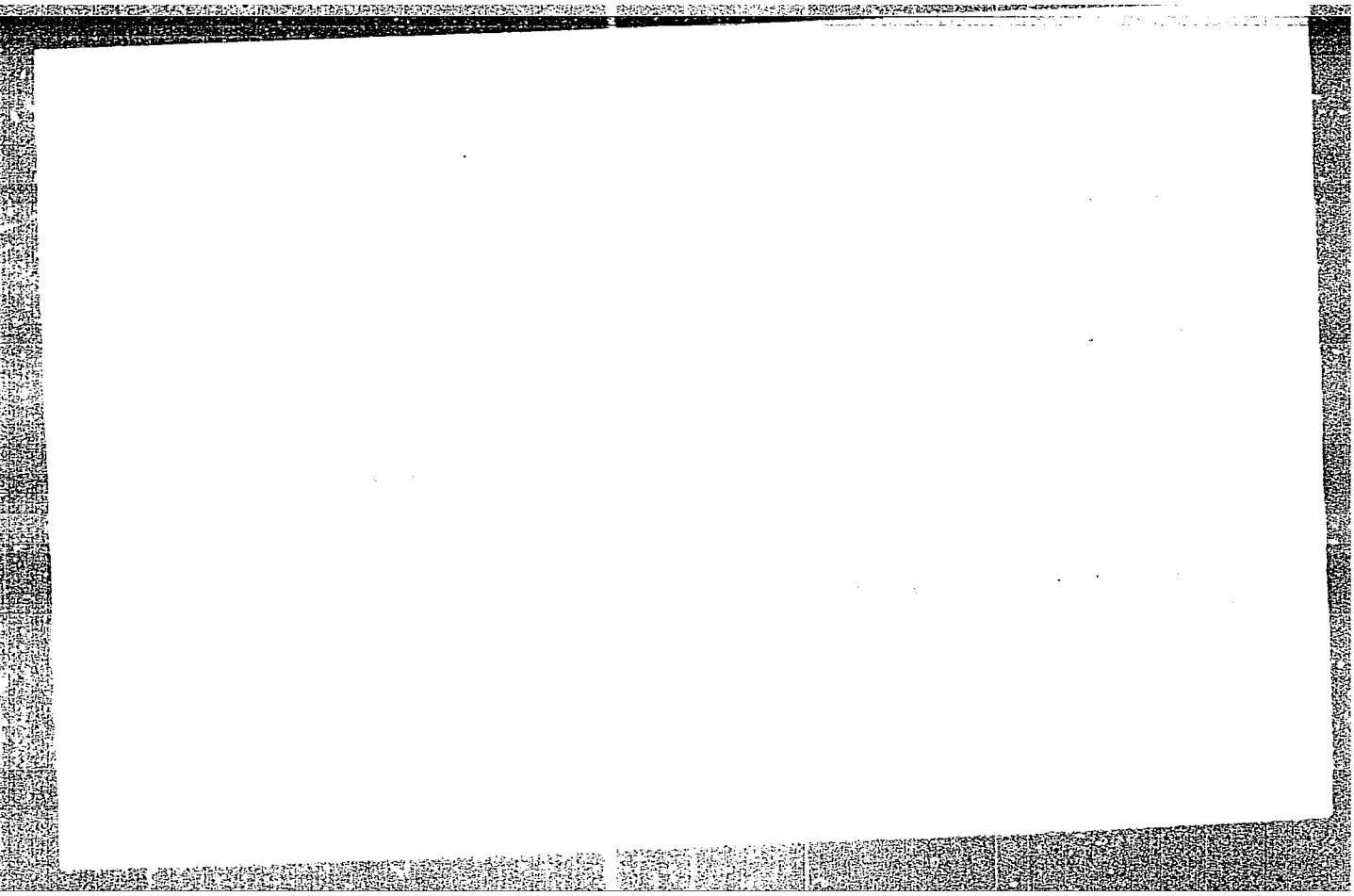

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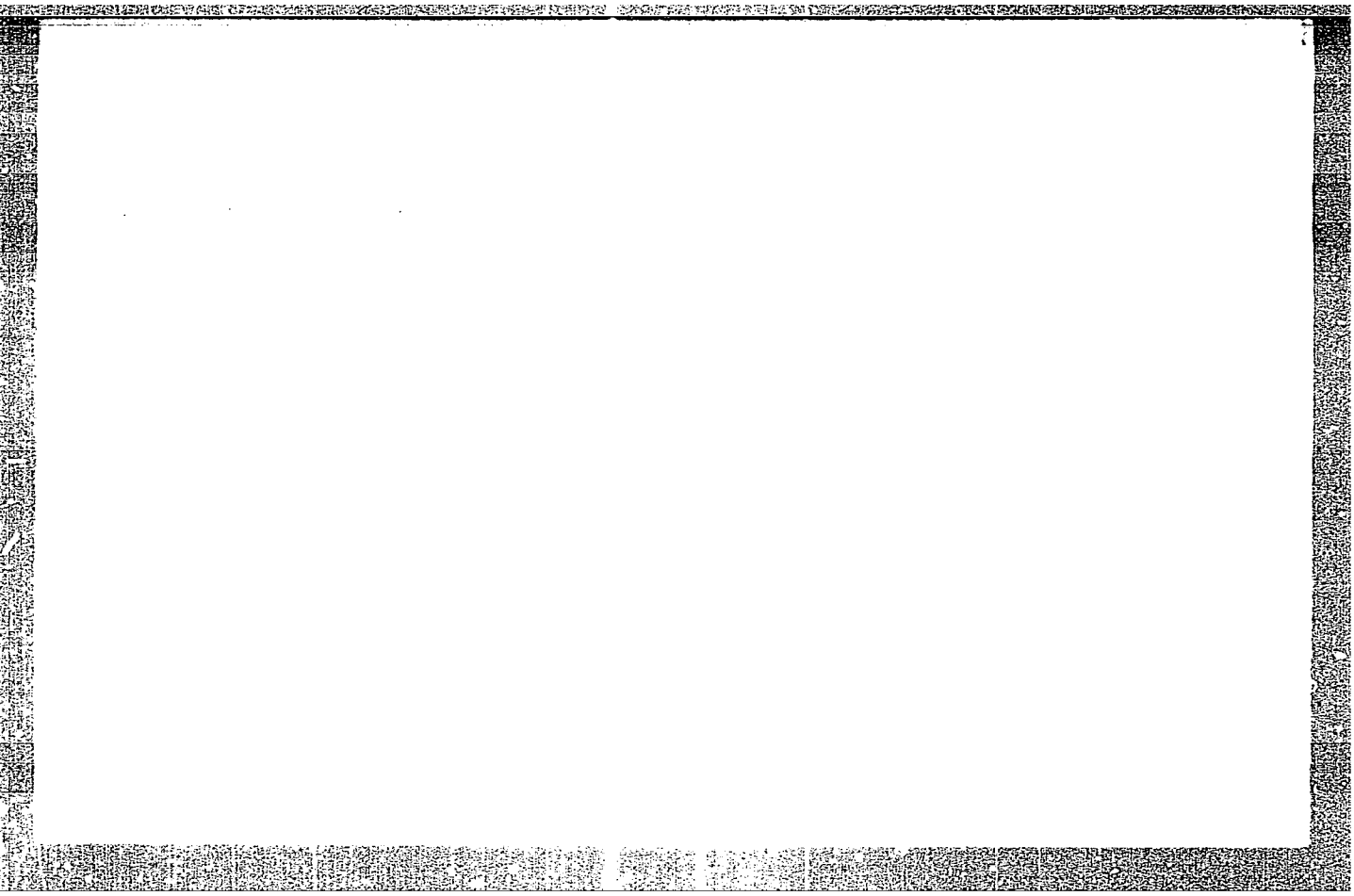

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PARGAMANIK, L.E.; DAYCH, A.R.; TSIRLIN, Yu.A.

Light transmission through diffusion light guides. Opt. i spektr. 17 no.5:776-783 N '64. (MIRA 17:12)

B/ TIRICHEVA, Z.B.; GUREVICH, M.Yu.; TSIRLIN, Yu.A.; SHVETS, V.A.

Effect of plastic deformation on the light yield of NaI (Tl) crystals. Opt. i spektr. 17 no.5:737-738 N '64.

(MIRA 17:1)

TSIRLIN, Yu.A.; KOZLOVA, E.A.

Regeneration of furfural from the vat residue in the vacuum distillation of crude furfural. Gidroliz. i lesokhim.prom. 16 no.8:11-12 '63. (MIRA 17:1)

1. Gosudarstvennyy nauchno-issledovatel'skiy institut gidroliznoy i sul'fitno-spirtovnoy promyshlennosti.

TSIRLIN, Yu.A.; IVANOVA, V.A.

Ways of improving the quality of furfurole. Sbor.trud. MIIGS 11: 127-138 '63. (MIRA 16:12)

AVERINA, L.N.; KERNER, B.I.; NIKULINA, R.A.; SOKOLOVSKAYA, T.I.; TSIRLIN, Yu. A.

Light collection in scintillators. Opt. i spekt. 15 no.2:274-280 Ag '63. (MIRA 17:1)

TSIRLIN, Yu.A.; SHISHOVA, L.N.; KIBAL'CHICH, G.A.

Shape of Compton spectra of organic scintillators. Prib. i tekh. eksp. 7 no.3:59-61 My-Je '62. (MIRA 16:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut monokristallov, stsintillyatsionnykh materialov i osobo chistykh khimicheskikh veshchestv.
(Scintillation spectrometry) (Compton effect)

TSIRLIN, Yu.A.

Shortcomings of the book on furfurol. Gidroliz. i lesokhim. prom. 16 no.4:31-32 '63. (MIRA 16:7)

(Furfural)

L 17778-63 EPR/EWT(l)/EPF(c)/EWT(m)/BDS AFFTC/ASD Ps-4/Pc-4/Pr-4
RM/WW/MAY
ACCESSION NR: AP3005854 S/0051/63/015/002/0274/0280 76 72

AUTHOR: Averina, L.N.; Kerner, B.I.; Nikulina, R.A.; Sokolovskaya, T.I.; Tsirlin, Yu.A.

TITLE: Light collection in scintillators

SOURCE: Optika i spektroskopiya, v.15, no.2, 1963, 274-280

TOPIC TAGS: scintillator, light collection, scintillator design

ABSTRACT: Expressions are derived for the light collecting coefficient τ of a cylindrical scintillator with polished surfaces and no packaging. The light-collecting coefficient is defined as the ratio of the radiant energy emerging through one face of the scintillator and entering the photomultiplier to the total energy produced by the scintillations in the volume of the scintillator with an absorption coefficient k and an index of refraction n. Knowledge of τ is obviously important for designing efficient scintillators and evaluating their overall efficiency. Fresnel reflection from the glass face of the photomultiplier tube is taken into account (reflections from the top and bottom ends of the cylinder compensate each other). The results of calculations by means of the deduced formulas were compared with experiment in two ways: 1) modelling, using a plexiglas cup filled with

Card 1/2

L 17778-63

ACCESSION NR: AP3005854

4

glycerol into which there was lowered a glass sphere with a persistent phosphor, and 2) measurements with standard plastic scintillators (polystyrene + terphenyl + + POPOP) 20 mm in diameter and of different heights, irradiated from an alpha-particle source. The experimental variation of τ with the height of the scintillator cylinder is consistont with the calculated dependence. Thus, the deduced formulas can be used for qualitative design calculations as well as for quantitative evaluations if the basic parameters of the scintillator material are known. "We thank L.L.Nagornaya for supplying the optical characteristics of the plastic and V.L.Timan for programming the necessary computations on a computer." Orig.art.has: 28 formulas and 8 figures.

ASSOCIATION: none

SUBMITTED: 20Oct62 DATE ACQ: 06Sep63 ENCL: 00

SUB CODE: PH NO REF SOV: 005 OTHER: 002

Card 2/2

TSIRLIN, Yu.A.; VASIL'YEVA, V.A.

Vapor-liquid equilibrium in the binary mixture water-acetic acid in case of increased pressure. Gidroliz.i lesokhim.prom. 15 no.6:11-13 '62. (MIRA 15:9)

1. Nauchno-issledovatel'skiy institut gidroliznoy i sul'fitnospirtovoy promyshlennosti.
(Vapor-liquid equilibrium)

TSIRLIN, Yu.A.; PARGAMANIK, L.E.; DAYCH, A.R.

Diffusion of light in dispersing media. Opt. i spektr. 12 no.2:304-310 F '62. (MIRA 15:2)
(Light--Scattering)

TSIRLIN, Yu.A. (Leningrad)

Vapor - liquid equilibrium in the system furfurole - water under reduced pressure. Zhur.fiz.khim. 36 no.8:1673-1677 Ag '62. (MIRA 15:8)

(Furaldehyde) (Phase rule and equilibrium)

TSIRLIN, Yu.A.; YASINSKAYA, A.A.

Nomogram for calculating the rate of steam flow in furfurole columns. Gidroliz.i lesokhim.prom. 15 no.3:19-20 '62. (MIRA 15:5)

1. Nauchno-issledovatel'skiy institut gidroliznoy i sul'fitnospirtovoy promyshlennosti.
(Furaldehyde) (Steam flow)

TSIRLIN, Yu.A.; SHVETS, V.A.; KHUDENSKIY, Yu.K.

Determining the resolving power of scintillation counters. Prib. i tekh.eksp. 7 no.1:56-57 Ja-F '62. (MIRA 15:3)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut monokristallov, stsintillyatsionnykh materialov i osobo chistykh khimicheskikh veshchestv.

(Scintillation counters--Testing)

TSIRLIN, Yu.A.

Vapor-liquid equilibrium in the system furfurole - water - acetic acid. Zhur.prikl.khim. 35 no.2:409-416 F '62. (MIRA 15:2)
(Furaldehyde) (Acetic acid) (Phase rule and equilibrium)

TSIRLIN, Yu.A.; VASIL'YEVA, V.A.; KUZNETSOVA, G.S.

Chemical purification of sewage containing furfurole. Gidroliz. i lesokhim. prom. 14 no.7:15-16 '61. (MIRA 14:11)

1. Nauchno-issledovatel'skiy institut gidroliznoy i sul'fitno-spirtovoy promyshlennosti.
(Sewage--Purification)
(Furaldehyde)

S/120/62/000/003/010/048
E032/E114

AUTHORS: Tsirlin, Yu.A., Shishova, L.N., and Kibal'chich, G.A.

TITLE: On the form of the Compton spectra of organic scintillators

PERIODICAL: Pribory i tekhnika eksperimenta, no.3, 1962, 59-61

TEXT: L. Maeder, R. Mueller and P. Wintersteiger (Helv. Phys. Acta, 27, 1954, 3) have reported a nomogram for the determination of the instrumental Compton spectrum for a given width of the photopeak. The present authors have investigated the applicability of the nomogram to organic scintillators and the possible use of the shape of the Compton spectrum of organic scintillators as an indication of the quality of the scintillators. The ФЭУ-13 (FEU-13) photomultiplier and the АИ-1-100 (AI-1-100) kicksorter (100 channels) were used in conjunction with three scintillators (stilbene, polystyrene + p-terphenyl + POPOP, naphthalene + anthranilic acid). Both encapsulated and free scintillators were used. In each case it was assumed that the right-hand side of the Compton curve was Gaussian and the standard deviation was determined. It was found that this approximation was satisfactory.

Card 1/2

Next, a plot was made of the standard deviation deduced from the Compton curve against the resolution of the conversion-electron peak for Cs^{137}. Good correlation was obtained and it is therefore concluded that the standard deviation of the right-hand side of the Compton distribution is a useful criterion of the quality of an organic scintillator.
There are 5 figures and 1 table.

ASSOCIATION: Vsesoyuznyy naúchno-issledovatel'skiy institut monokristallov, stsintillyatsionnykh materialov i osobo chistykh khimicheskikh veshchestv
(All-Union Scientific Research Institute for Single Crystals, Scintillators and Very Pure Chemicals)

SUBMITTED: November 21, 1961

SOFRONOV, A.M. [deceased]; TSIRLIN, Yu.A.

Some physical properties of head cabbage. Izv.vys.ucheb.zav.; pishch. tekh. no.6:23-27 '61. (MIRA 15:2)

1. Khar'kovskiy sel'skokhozyaystvennyy institut imeni V.V.Dokuchayeva, kafedra fiziki i meteorologii i kafedra rasteniyevodstva.

S/120/62/000/001/011/061
E032/E514

AUTHORS: Tsirlin, Yu.A., Shvets, V.A. and Khudenskiy, Yu.K.

TITLE: Determination of the resolution of scintillation counters

PERIODICAL: Pribory i tekhnika eksperimenta, no.1, 1962, 56-57

TEXT: The resolution of a scintillation counter with sodium iodide or caesium iodide phosphors is usually determined either as the half-width of the Cs^{137} photo-peak divided by the corresponding channel number, or by comparing the two Co^{60} peaks at 1.17 and 1.33 MeV with the depth of the minimum between them. There is no published method whereby the results of these two determinations can be compared. The authors have found a relation between the ratio of the 1.33 MeV peak to the ordinate of the minimum of the pulse height distribution curve and the resolution R_{Co} for 1.33 MeV gamma-rays. In the calculation it was assumed that the photoelectric cross-section in this energy range is inversely proportional to $E^{1,35}$, that the form of the photo-peak is Gaussian and that the resolution of the scintillation

Card 1/2

counter is inversely proportional to $E^{0.5}$. It is shown that the relation between the above ratio and the resolution is in fact

$$\xi = 0.44 \exp (115/R^2).$$

This result is in good agreement with the reported experimental values for crystals with linear dimensions in excess of 1 cm. There is 1 figure.

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(Optics, Physical) (Wave guides)